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L22	natural gas near3 tail gas	0	L22
L21	methane near3 tail gas	36	L21
L20	natural gas near3 tail gas	0	L20
L19	feed\$3 near3 natural gas near3 tail gas	0	L19
L18	feed\$3 with carbonaceous with tail gas	0	L18
L17	feed\$3 near3 carbonaceous near4 tail gas	0	L17
L16	reacting near3 carbonaceous near4 tail gas	1	L16
L15	reacting carbonaceous near4 tail gas	0	L15
L14	reating natural gas near2 tail gas	0	L14
L13	reat\$3 near1 hydrocarbon near2 tail gas	0	L13
L12	l11 not l10	19	L12
L11	react\$3 near3 hydrocarbon\$1 near5 tail gas	20	L11
L10	feed\$3 near3 hydrocarbon\$1 near5 tail gas	4	L10
L9	feed\$3 near3 natural gas near5 tail gas	0	L9
L8	feed\$3 near3 methane near5 tail gas	1	L8
L7	reacting near3 methane near5 tail gas	0	L7
L6	carbonaceous near4 tail gas	4	L6
L5	L4 and (fischer near1 tropsch or liquid near1 hydrocarbon\$1)	15	L5
L4	L3 and (synthesis gas or carbon monoxide near1 hydrogen)	15	L4
L3	L2 or L1	18	L3
L2	separat\$3 near4 carbon dioxide near5 tail gas	16	L2
L1	remov\$3 near4 carbon dioxide near5 tail gas	4	L1

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FILE COVERS 1907 - 9 Jun 2003 VOL 138 ISS 24

FILE LAST UPDATED: 8 Jun 2003 (20030608/ED)

This file contains CAS Registry Numbers for easy and accurate  
 substance identification.

=> s natural gas (3a) tail gas

573675 NATURAL

27 NATURALS

573691 NATURAL

(NATURAL OR NATURALS)

1296255 GAS

442870 GASES

1458764 GAS

(GAS OR GASES)

59948 NATURAL GAS

(NATURAL (W) GAS)

```

52442 TAIL
10041 TAILS
59807 TAIL
      (TAIL OR TAILS)
1296255 GAS
442870 GASES
1458764 GAS
      (GAS OR GASES)
1337 TAIL GAS
      (TAIL(W) GAS)
L1      21 NATURAL GAS (3A) TAIL GAS

=> s l1 and synthesis gas
1062756 SYNTHESIS
      3 SYNTHESISES
59038 SYNTHESES
1096855 SYNTHESIS
      (SYNTHESIS OR SYNTHESISES OR SYNTHESES)
1296255 GAS
442870 GASES
1458764 GAS
      (GAS OR GASES)
13362 SYNTHESIS GAS
      (SYNTHESIS(W) GAS)
L2      6 L1 AND SYNTHESIS GAS

=> s carbonaceous (5a) tail gas
34325 CARBONACEOUS
52442 TAIL
10041 TAILS
59807 TAIL
      (TAIL OR TAILS)
1296255 GAS
442870 GASES
1458764 GAS
      (GAS OR GASES)
1337 TAIL GAS
      (TAIL(W) GAS)
L3      0 CARBONACEOUS (5A) TAIL GAS

=> s react? (3a) natural gas (3a) tail gas
4171779 REACT?
573675 NATURAL
      27 NATURALS
573691 NATURAL
      (NATURAL OR NATURALS)
1296255 GAS
442870 GASES
1458764 GAS
      (GAS OR GASES)
59948 NATURAL GAS
      (NATURAL(W) GAS)
52442 TAIL
10041 TAILS
59807 TAIL
      (TAIL OR TAILS)
1296255 GAS
442870 GASES
1458764 GAS
      (GAS OR GASES)
1337 TAIL GAS
      (TAIL(W) GAS)

```

L4 0 REACT? (3A) NATURAL GAS (3A) TAIL GAS

=> s feed? (3a) natural gas (3a) tail gas

391568 FEED?  
573675 NATURAL  
27 NATURALS  
573691 NATURAL  
(NATURAL OR NATURALS)  
1296255 GAS  
442870 GASES  
1458764 GAS  
(GAS OR GASES)  
59948 NATURAL GAS  
(NATURAL(W) GAS)  
52442 TAIL  
10041 TAILS  
59807 TAIL  
(TAIL OR TAILS)  
1296255 GAS  
442870 GASES  
1458764 GAS  
(GAS OR GASES)  
1337 TAIL GAS  
(TAIL(W) GAS)

L5 1 FEED? (3A) NATURAL GAS (3A) TAIL GAS

=> d 15 ibib ab

L5 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1986:445818 CAPLUS  
DOCUMENT NUMBER: 105:45818  
TITLE: Removal of hydrogen sulfide from gases  
INVENTOR(S): Lynn, Scott  
PATENT ASSIGNEE(S): University of California, Berkeley, USA  
SOURCE: PCT Int. Appl., 49 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 8602628	A1	19860509	WO 1985-US2179	19851101
W: JP				
RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE				
EP 199815	A1	19861105	EP 1985-905972	19851101
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
US 4976935	A	19901211	US 1988-210750	19880615
PRIORITY APPLN. INFO.:			US 1984-657809	19841104

AB A 2-stage process is described for the removal of H<sub>2</sub>S from gas mixts. In the 1st stage, solns. of H<sub>2</sub>S (excess) and SO<sub>2</sub> react to give S and water. The excess H<sub>2</sub>S is treated in a 2nd stage with a soln. of SO<sub>2</sub>, and any excess SO<sub>2</sub> in the vapor phase is absorbed by the solvent. The solvent used in both stages is selected to have a high solvating power for SO<sub>2</sub>, a lesser but substantial solvating power for H<sub>2</sub>S, and to promote the 2H<sub>2</sub>S + SO<sub>2</sub> .fwdarw. 2H<sub>2</sub>O + 3S reaction, and may be a mixt., e.g., contg. glycol ethers (for solvation) and quinoline-type arom. compds. (for reaction promotion). The process can be controlled by the selection of solvents and conditions (e.g., by the soly. of valuable minor components, such as C<sub>3</sub>H<sub>8</sub>); thus, it can be tailored for the treatment of varying feed gases (e.g., **natural gas**, synthesis gas, or

**tail gas** from a Claus plant). The process also avoids the need to maintain exact stoichiometry of H<sub>2</sub>S and SO<sub>2</sub>. The app. for the process is described in detail with drawings.

=> d his

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L1 21 S NATURAL GAS (3A) TAIL GAS  
L2 6 S L1 AND SYNTHESIS GAS  
L3 0 S CARBONACEOUS (5A) TAIL GAS  
L4 0 S REACT? (3A) NATURAL GAS (3A) TAIL GAS  
L5 1 S FEED? (3A) NATURAL GAS (3A) TAIL GAS

=> s l2 not l5

L6 5 L2 NOT L5

=> d l6 ibib ab 1-5

L6 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2003:82756 CAPLUS  
DOCUMENT NUMBER: 138:305782  
TITLE: Production of methanol  
INVENTOR(S): Pisarenko, V. N.; Abaskuliev, D. A.; Kosunov, O. A.  
PATENT ASSIGNEE(S): Russia  
SOURCE: Russ., No pp. given  
CODEN: RUXXE7  
DOCUMENT TYPE: Patent  
LANGUAGE: Russian  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
RU 2188790	C1	20020910	RU 2001-121977	20010807

PRIORITY APPLN. INFO.: RU 2001-121977 20010807

AB The method includes stages of partial oxidn. of hydrocarbons, purifn. of **synthesis gas**, conversion of **synthesis gas** to MeOH in a series of reactors, and recovery of heat of tail gases in power and/or thermal plants. Partial oxidn. of gaseous hydrocarbons is conducted in an energy catalytic unit including a power machine and catalytic reactors at a mol ratio of O<sub>2</sub> to gaseous hydrocarbons <0.6:1, a mol ratio of H<sub>2</sub>O(g) to gaseous hydrocarbons <0.7:1, and temp. in reaction zones of the catalytic reactors >700.degree.. Synthesis of MeOH from **synthesis gas** contg. >30 vol.% N<sub>2</sub> is conducted at cyclic changes of a raw material concn. in inlet flows of each of them. The MeOH synthesis is an energy-closed process with a low consumption of raw materials and decreased power requirements. The resulting MeOH has a high purity. The energy-saving process is suitable for prodn. of MeOH from **natural gas** and hydrocarbon-contg. **tail gases** of industrial processes.

L6 ANSWER 2 OF 5 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2001:115248 CAPLUS  
DOCUMENT NUMBER: 134:165467  
TITLE: Integrated process for converting hydrocarbon gas to liquids  
INVENTOR(S): Gieskes, Thomas  
PATENT ASSIGNEE(S): Atlantic Richfield Company, USA  
SOURCE: PCT Int. Appl., 38 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001010979	A1	20010215	WO 2000-US21352	20000804
W: AE, AU, ID, TT				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 6248794	B1	20010619	US 1999-369045	19990805
EP 1204717	A1	20020515	EP 2000-955374	20000804
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				

PRIORITY APPLN. INFO.: US 1999-369045 A 19990805  
WO 2000-US21352 W 20000804

AB In a first embodiment, a Fischer-Tropsch (FT) process is integrated with a cryogenic liquefied **natural gas** (LNG) process wherein **tail gas** from (FT) reaction is used to drive a refrigeration compressor in the (LNG) process. The process may be further integrated with a fertilizer prodn. process comprising an ammonia synthesis process and a urea synthesis process. To produce ammonia, hydrogen sepd. from **synthesis gas** produced in a primary and/or secondary reformer in the (FT) process is combined with nitrogen produced in the (LNG) process. Nitrogen may also be supplied to the ammonia synthesis process from an optional air sepn. process, which also provides oxygen enrichment to the thermal reformer in the (FT) process. The produce urea, the ammonia is subsequently reacted with carbon dioxide removed during processing of the gas prior to its liquefaction. In an alternative embodiment, an (FT) process is integrated with a methanol synthesis process wherein tail gas from the (FT) reaction is used to fuel burners in a secondary thermal reformer.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2003 ACS  
ACCESSION NUMBER: 1966:410134 CAPLUS  
DOCUMENT NUMBER: 65:10134  
ORIGINAL REFERENCE NO.: 65:1822g-h  
TITLE: Carbon black feedstock treatment  
PATENT ASSIGNEE(S): Continental Carbon Co.  
SOURCE: 19 pp.  
DOCUMENT TYPE: Patent  
LANGUAGE: Unavailable  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
NL 65010951		19660221	NL	

PRIORITY APPLN. INFO.: US 19640820

AB In the manufacture of C black by the furnace process, the liquid hydrocarbon raw material (C-H ratio 0.75 to 1.25; API density <30; av. mol. wt. 140-550; <40% of material coking <290.degree.) is continually stripped by **natural gas, synthesis gas, tail gas** from the furnace process itself, or other gases with a low heat content, the stripping mixt. is fed into the furnace to provide the required heat by combustion, and the stripped liquid hydrocarbon material is fed into the furnace as the feed for C black formation.



L6 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1957:31867 CAPLUS  
DOCUMENT NUMBER: 51:31867  
ORIGINAL REFERENCE NO.: 51:6124d-e  
TITLE: Practical application of the cracking of refinery  
**tail gases, natural**  
**gas**, and propane in gasifiers  
AUTHOR(S): Schussl, Franz  
SOURCE: Gas, Wasser, Warme (1956), 10, 164-73  
DOCUMENT TYPE: Journal  
LANGUAGE: Unavailable

AB Detailed fullscale test data on the operation of 4 European water-gas generators (I) are given, in which hydrocarbon gases were cracked: (a) at the Gasworks Naples, Italy, refinery tail gases were cracked in a I gasifying coal to town gas; (b) at the Gasworks Como, Italy, natural gas was cracked in a I gasifying coke to town gas; (c) at the Gasworks Dijon, France, propane was cracked in a I gasifying coal to town gas; and (d) at the Synthesis Works IMAD, Naples, Italy, refinery tail gases were cracked in a I gasifying coke to a **synthesis gas**.

L6 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1952:7044 CAPLUS  
DOCUMENT NUMBER: 46:7044  
ORIGINAL REFERENCE NO.: 46:1234g-i  
TITLE: **Synthesis gases**  
INVENTOR(S): Garrison, Allen D.  
PATENT ASSIGNEE(S): Texaco Development Corp.  
DOCUMENT TYPE: Patent  
LANGUAGE: Unavailable  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	-----
	US 2566936		19510904	US	
AB	A mixt. of H and CO in a ratio of 2:1 is produced from natural gas or CH <sub>4</sub> in a 3-stage continuous process employing a highly porous refractory heated to a high temp. In the 1st stage, a mixt. of air, steam, H, and a hydrocarbon or natural gas is allowed to react in the refractory until a temp. of 2000-2200.degree. is reached. In the 2nd stage, CH <sub>4</sub> or natural gas compressed to 250 lb./sq. in. is passed at low space velocity through the hot refractory where it is cracked to produce C and H. The C is retained in the pores of the refractory, and with a fall of temp. to approx. 1650-1850.degree., the cracking stage is discontinued. In the 3rd, or generative, stage a mixt. of steam, <b>natural gas</b> , and <b>tail gas</b> is passed through the refractory. The proportions of CO and H, major products of this reaction, are regulated by varying the gaseous charge mixt. With fall of temp. to approx. 900-1000.degree., the heating stage is resumed. Pulverized coal or liquids, such as kerosene or fuel oil, may be used in place of natural gas. Cf. C.A. 45, 6824i.				

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L3: Entry 1 of 1

File: USPT

Oct 23, 2001

DOCUMENT-IDENTIFIER: US 6306917 B1

TITLE: Processes for the production of hydrocarbons, power and carbon dioxide from carbon-containing materials

US Patent No. (1):  
6306917Brief Summary Text (23):

Another means for increasing the hydrocarbon yield and carbon conversion efficiency of a system is to recycle part of the tail gas to the inlet of the POX unit. However, the amount of tail gas recycle is limited by the resulting low H.sub.2 :CO ratio in the synthesis gas produced in the POX caused by the large amount of CO.sub.2 in the tail gas.

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FILE COVERS 1907 - 9 Jun 2003 VOL 138 ISS 24

FILE LAST UPDATED: 8 Jun 2003 (20030608/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> s mixing (1) carbon dioxide (1) synthesis gas

338351 MIXING  
 1530 MIXINGS  
 339012 MIXING  
 (MIXING OR MIXINGS)  
 987633 CARBON  
 22118 CARBONS  
 995900 CARBON  
 (CARBON OR CARBONS)  
 385027 DIOXIDE  
 6178 DIOXIDES

386599 DIOXIDE  
 (DIOXIDE OR DIOXIDES)  
 175679 CARBON DIOXIDE  
 (CARBON (W) DIOXIDE)  
 1062756 SYNTHESIS  
 3 SYNTHESISES  
 59038 SYNTHESSES  
 1096855 SYNTHESIS  
 (SYNTHESIS OR SYNTHESISES OR SYNTHESSES)  
 1296255 GAS  
 442870 GASES  
 1458764 GAS  
 (GAS OR GASES)  
 13362 SYNTHESIS GAS  
 (SYNTHESIS (W) GAS)  
 L1 6 MIXING (L) CARBON DIOXIDE (L) SYNTHESIS GAS

=> d l1 ibib ab 1-6

L1 ANSWER 1 OF 6 CAPLUS COPYRIGHT 2003 ACS  
 ACCESSION NUMBER: 2002:123707 CAPLUS  
 DOCUMENT NUMBER: 136:297145  
 TITLE: Direct Conversion of Greenhouse Gases to Synthesis Gas  
 and C4 Hydrocarbons over Zeolite HY Promoted by a  
 Dielectric-Barrier Discharge  
 AUTHOR(S): Zhang, Kui; Eliasson, Baldur; Kogelschatz, Ulrich  
 CORPORATE SOURCE: ABB Corporate Research Ltd., Baden-Dattwil, CH-5405,  
 Switz.  
 SOURCE: Industrial & Engineering Chemistry Research (2002),  
 41(6), 1462-1468  
 CODEN: IECRED; ISSN: 0888-5885  
 PUBLISHER: American Chemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The direct conversion of methane and **carbon dioxide** to  
 produce C4 hydrocarbons (C4H8, n-C4H10, i-C4H10) and **synthesis  
 gas** (H2 + CO) was investigated over quartz fleece, zeolite NaA,  
 zeolite NaY, and zeolite HY catalysts promoted by dielec.-barrier  
 discharges (DBDs) at relatively low temps. and ambient pressure. Both  
 pore size and electrostatic properties of zeolites influence the reaction  
 under nonequil. plasma conditions. Zeolite HY is the most promising  
 catalyst in producing **synthesis gas** (H2 + CO) and C4  
 hydrocarbons (C4H8, n-C4H10, i-C4H10) with high selectivity at low temps.  
 and ambient pressure. The important variables affecting the activity and  
 selectivity of a zeolite HY catalyst in a DBD reactor such as temporal  
 stability, discharge power, **mixing** ratios of methane to  
**carbon dioxide**, space velocity, operating pressure, and  
 wall temp. were studied. The conversion of methane was 55.1% and that of  
**carbon dioxide** 26.7%, and the selectivity to CO was  
 21.7% and that to C4 hydrocarbons reached 52.1% when the reaction was  
 performed at a wall temp. of 423 K, gas pressure of 1 bar, molar ratio of  
 methane/**carbon dioxide** of 3:1, feed gas flow rate of  
 200 mL/min, and discharge power of 500 W.

REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 2 OF 6 CAPLUS COPYRIGHT 2003 ACS  
 ACCESSION NUMBER: 2001:102586 CAPLUS  
 DOCUMENT NUMBER: 134:210300  
 TITLE: Catalytic partial oxidation of natural gas -  
 operational tests, modeling and prospects  
 AUTHOR(S): Dmoch, Marek; Golebiowski, Andrzej; Wrobel, Waldemar;

Stolecki, Kazimierz  
CORPORATE SOURCE: Inst. Nawozow Sztucznych, Pulawy, 24-110, Pol.  
SOURCE: Technologia Chemiczna na Przelomie Wiekow (2000),  
99-102. Wydawnictwo Stalego Komitetu Kongresow  
Technologii Chemicznej: Gliwice, Pol.  
CODEN: 69AXVP  
DOCUMENT TYPE: Conference  
LANGUAGE: Polish  
AB Catalytic partial oxidn. of natural gas is a combination of a  
non-catalytic methane oxidn. in the presence of steam or **carbon  
dioxide** with autothermal steam reforming process on nickel  
catalyst. Partial oxidn. process is used in hydrogen prodn. plants, in  
**synthesis gas** prodn. for ammonia synthesis, in methanol  
and oxo alcs. prodn. plants. Usually partial oxidn. reactions operate at  
pressure 2.div.4 MPa, H2O/C ratio 1.5.div.2.5 and outlet temp.  
950.div.1000.degree.C. The product compn. is close to the equil. compn.  
The results of thermodyn. calcns. showing the influence of operating  
parameters on the compn. of **synthesis gas** for various  
present and future applications are presented. Available technol. data on  
reactors operation, concerning mainly burners, the dimension of  
combustible chamber, and catalyst bed were collected and analyzed. A  
math. model and program for calcn. of partial oxidn. reactor were  
developed on the basis of our own kinetic measurement concerning catalyst  
deactivation. Calcn. results showing the influence of insufficient gas  
**mixing** in the combustion chamber on methane conversion are  
presented. The developed program can be used for designing and reactor  
optimization and for evaluation of industrial reactor conditions.

L1 ANSWER 3 OF 6 CAPLUS COPYRIGHT 2003 ACS  
ACCESSION NUMBER: 2001:72674 CAPLUS  
DOCUMENT NUMBER: 134:180855  
TITLE: Conversion of greenhouse gases to synthesis gas and  
higher hydrocarbons  
AUTHOR(S): Zhang, Kui; Kogelschatz, Ulrich; Eliasson, Baldur  
CORPORATE SOURCE: ABB Corporate Research Ltd., Baden-Dattwil, 5405,  
Switz.  
SOURCE: Energy & Fuels (2001), 15(2), 395-402  
CODEN: ENFUEM; ISSN: 0887-0624  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The reaction of methane with **carbon dioxide** to produce  
**synthesis gas** (H2 + CO), gaseous hydrocarbons (C2-C4),  
and higher hydrocarbons was investigated over quartz fleece, zeolite X,  
zeolite HY, and zeolite NaY catalysts promoted by dielec.-barrier  
discharges at low temp. and ambient pressure. Zeolite NaY is the most  
promising catalyst for producing **synthesis gas** (H2 +  
CO) and liq. hydrocarbons (C5+) with high methane and **carbon  
dioxide** conversions. The important variables affecting the  
activity and selectivity of zeolite NaY catalyst such as discharge power,  
wall temp., flow rate, **mixing** ratio of methane to **carbon  
dioxide**, and temporal stability were studied. The conversion of  
CH4 was 67%, and that of CO2 was 40%. The yield of **synthesis  
gas** was 47%, and the selectivity to liq. hydrocarbons (C5+) was  
34% when the reaction was performed at a wall temp. of 423 K, gas pressure  
of 1 bar, molar ratio of CH4 to CO2 of 1, feed gas flow rate of 200  
mL/min, and input power of 500 W. Zeolite NaY has potential application  
in the prodn. of **synthesis gas** (H2 + CO) and liq.  
hydrocarbons (C5+) in a dielec.-barrier discharge reactor at low temp. and  
ambient pressure.  
REFERENCE COUNT: 50 THERE ARE 50 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 4 OF 6 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1999:420437 CAPLUS

DOCUMENT NUMBER: 131:118010

TITLE: Production of synthesis gas through plasma-assisted reforming of greenhouse gases

AUTHOR(S): Kogelschatz, U.; Zhou, L. M.; Xue, B.; Eliasson, B.

CORPORATE SOURCE: ABB Corporate Research Ltd., Baden, 5405, Switz.

SOURCE: Greenhouse Gas Control Technologies, Proceedings of the International Conference on Greenhouse Gas Control Technologies, 4th, Interlaken, Switz., Aug. 30-Sept. 2, 1998 (1999), Meeting Date 1998, 385-390.

Editor(s): Eliasson, Baldur; Riemer, Pierce; Wokaun, Alexander. Elsevier: Oxford, UK.

CODEN: 67TZAN

DOCUMENT TYPE: Conference

LANGUAGE: English

AB Low temp. conversion of the two major greenhouse gases CO<sub>2</sub> and CH<sub>4</sub> to **synthesis gas** (a mixt. of H<sub>2</sub> and CO) is investigated theor. and exptl. in a high power dielec.-barrier discharge (DBD). Utilizing this nonequil. discharge technique high conversion rates can be achieved in this special gas mixt. A pronounced synergetic effect caused by free radical reactions was obsd. using these two gases simultaneously. This way CO<sub>2</sub> sep'd. from flue gases could be combined with methane to produce syngas which then can be processed to yield liq. fuels like e.g. methanol or di-Me ether. Parameters studied are CH<sub>4</sub>/CO<sub>2</sub> **mixing** ratio (0-100% of CO<sub>2</sub>), elec. power (100-800 W), flow rate (0.1-4 NL/min), gas pressure (0.35-2 bar) and reactor wall temp. (80-250.degree.). This technique of plasma reforming of methane with **carbon dioxide** can produce syngas with different H<sub>2</sub>/CO ratios depending mainly on the CH<sub>4</sub>/CO<sub>2</sub> **mixing** ratio. The amt. of syngas produced rises almost linearly with increasing discharge power. Up to 66 mol of syngas with a H<sub>2</sub>/CO ratio of 3.7 were obtained from 100 mol of feed gas in a single pass through the DBD reactor of 31 cm active length. The min. required specific energy was 40 eV/mol. for the prodn. of syngas (H<sub>2</sub> plus CO) and the highest energy efficiency (elec. energy converted to chem. energy in the syngas) reached so far was about 7%.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 5 OF 6 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1995:727426 CAPLUS

DOCUMENT NUMBER: 123:117899

TITLE: Catalytic reduction of carbon dioxide - The effects of catalysts and reductants

AUTHOR(S): Park, S. -E.; Nam, S. S.; Choi, M. J.; Lee, K. W.

CORPORATE SOURCE: Korea Research Institute Chemical Technology, Taejon, 305-606, S. Korea

SOURCE: Energy Conversion and Management (1995), 36(6-9), 573-6

CODEN: ECMADL; ISSN: 0196-8904

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Several trials were performed for the catalytic fixation of **carbon dioxide** by using hydrogen as well as methane as reductants in order to convert into useful chems., such as oxygenates and hydrocarbons and **synthesis gas**, resp. As trials for the alleviation of chem. equil. limit in the CO<sub>2</sub> hydrogenation into methanol, the hybridized catalysts, such as H-zeolites and K-doped Fe/L zeolite catalysts were prep'd. by **mixing** with the methanol catalyst Cu/ZnO/Al<sub>2</sub>O<sub>3</sub>. The formation of oxygenated compds. and hydrocarbons, and

of the Me formate were confirmed. Another trial was the Fischer-Tropsch reaction approach to synthesize hydrocarbons directly with CO<sub>2</sub>/H<sub>2</sub> over iron-based bimetallic catalysts. Fe-Co bimetallic catalysts showed over 60% CO<sub>2</sub> conversion. **Carbon dioxide** reforming with methane was investigated over pentasil zeolite-supported nickel catalyst, which gave near equil. conversion of CO<sub>2</sub> and also near equil. yield on **synthesis gas** with high stability. Pentasil zeolite was superior as support, and alk. promoters also attributed to have high dispersion and stability of nickel species.

L1 ANSWER 6 OF 6 CAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1995:342201 CAPLUS

DOCUMENT NUMBER: 123:117874

TITLE: Production of synthesis gas by partial oxidation of methane and reforming of methane with carbon dioxide

AUTHOR(S): Uchijima, Toshio; Nakamura, Junji; Sato, Koichi; Aikawa, Keita; Kubushiro, Kaneshige; Kunimori, Kimio

CORPORATE SOURCE: Institute of Materials Science, University of Tsukuba, Tsukuba, 305, Japan

SOURCE: Studies in Surface Science and Catalysis (1994), 81(Natural Gas Conversion II), 325-7  
CODEN: SSCTDM; ISSN: 0167-2991

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The prodn. of **synthesis gas** by partial oxidn. of methane and reforming of methane with **carbon dioxide** over supported Rh catalysts have been studied over a range of temps. (550-1000 K). Effect of support on catalytic activity for partial oxidn. of methane over Rh catalysts was explained by Rh dispersion, where the activities and the dispersions were correlated. On the other hand, for reforming of methane with **carbon dioxide**, metal oxides used for support significantly influenced catalytic activity. Phys. **mixing** of metal oxides such as Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, and MgO with Rh/SiO<sub>2</sub> caused a marked improvement of the catalytic activity of Rh/SiO<sub>2</sub>.